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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/954,596	09/12/2001	Anton Gunzinger	FREI P033US-2	8857
21121	7590	09/21/2004	EXAMINER	
OPPEDAHL AND LARSON LLP P O BOX 5068 DILLON, CO 80435-5068			ELLIS, RICHARD L	
			ART UNIT	PAPER NUMBER
			2183	

DATE MAILED: 09/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Advisory Action

Application No.

09/954,596

Applicant(s)

GUNZINGER, ANTON

Examiner

Richard Ellis

Art Unit

2183

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 17 August 2004 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE. Therefore, further action by the applicant is required to avoid abandonment of this application. A proper reply to a final rejection under 37 CFR 1.113 may only be either: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114.

PERIOD FOR REPLY [check either a) or b)]

- a) ☒ The period for reply expires 5 months from the mailing date of the final rejection.
b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
ONLY CHECK THIS BOX WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

1. ☐ A Notice of Appeal was filed on _____. Appellant's Brief must be filed within the period set forth in 37 CFR 1.192(a), or any extension thereof (37 CFR 1.191(d)), to avoid dismissal of the appeal.
2. ☒ The proposed amendment(s) will not be entered because:
(a) ☐ they raise new issues that would require further consideration and/or search (see NOTE below);
(b) ☐ they raise the issue of new matter (see Note below);
(c) ☒ they are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
(d) ☐ they present additional claims without canceling a corresponding number of finally rejected claims.


NOTE: _____

3. ☐ Applicant's reply has overcome the following rejection(s): _____.
4. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
5. ☒ The a) ☐ affidavit, b) ☐ exhibit, or c) ☒ request for reconsideration has been considered but does NOT place the application in condition for allowance because: See attachment.
6. ☐ The affidavit or exhibit will NOT be considered because it is not directed SOLELY to issues which were newly raised by the Examiner in the final rejection.
7. ☒ For purposes of Appeal, the proposed amendment(s) a) ☒ will not be entered or b) ☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.

The status of the claim(s) is (or will be) as follows:

Claim(s) allowed: none.Claim(s) objected to: none.Claim(s) rejected: 16-31,33 and 34.Claim(s) withdrawn from consideration: none.

8. ☐ The drawing correction filed on _____ is a) ☐ approved or b) ☐ disapproved by the Examiner.
9. ☐ Note the attached Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
10. ☐ Other: _____


RICHARD L. ELLIS
PRIMARY EXAMINER

Continuation of box 5 of advisory action.

1. Applicant's after final submission has been reviewed but is not persuasive for the following reasons:

Applicant argues in the response:

- 1.1. That: "The Parrish references teach a *bus oriented* system. The bus structure of the Parrish references allows message passing processes. However, in Parrish, all processor elements (which the Examiner equates to Parrish's "functional units") are on a common bus. Parrish, therefore does not teach a message passing communication *network*. A one-dimensional structure such as a bus is not a network according to a usual definition."

This is not found persuasive because applicant is not only arguing additional limitations that are not present within the claim language, but applicant is also arguing a definition of "network" which simply does not exist.

Claimed subject matter, not the specification, is the measure of invention. Limitations in the specification cannot be read into the claims for the purpose of avoiding the prior art. *In re Self*, 213 USPQ 1,5 (CCPA 1982); *In re Priest*, 199 USPQ 11,15 (CCPA 1978).

"It is the claims that measure the invention." *SRI Int'l v. Matsushita Elec. Corp.*, 775 F.2d 1107, 1121, 227 USPQ 577, 585 (Fed. Cir. 1985) (en banc).

"The invention disclosed in Hiniker's written description may be outstanding in its field, but the name of the game is the claim." *In re Hiniker Co.*, 47 USPQ2d 1523, 1529 (Fed. Cir. 1998).

"[A]s an initial matter, the PTO applies to the verbiage of the proposed claims the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in the applicant's specification." *In re Morris*, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997).

"limitations appearing in the specification will not be read into the claims, and ... interpreting what is meant by a word in a claim 'is not to be confused with adding an extraneous limitation appearing in the specification, which is improper'." *Intervet Am., v. Kee-Vet Labs.*, 12 USPQ2d 1474, 1476 (Fed. Cir. 1989)(citation omitted).

"it is entirely proper to use the specification to interpret what the patentee meant by a word or phrase in the claim, ... this is not to be confused with adding an extraneous limitation appearing in the specification, which is improper. By 'extraneous,' we mean a limitation read into a claim from the specification wholly apart from any need to interpret ... particular words or phrases in the claim." *In re Paulsen*, 31 USPQ2d 1671, 1674 (Fed. Cir. 1994) (citation omitted).

Additionally, as shown in the attached copies from four different dictionaries, the accepted normal definition of "network" is simply an interconnected set or group of computers. The definition applicant alludes to in his arguments simply does not exist, and additionally, applicant's originally filed specification not only fails to specifically and deliberately define network as such, but in fact also indicates that the type of network used is immaterial to the invention (pg. 4 lines 6-11):

No assumptions are made concerning the communications network. Illustratively "Fast Ethernet", ATM, GigaBit Ethernet, Fiber Channel or any other fast network may be used. Again no assumptions are made concerning topology; buses, stars, rings, 2-D or 3-D networks (torus) may be used, or any other topology.

Therefore, because not only is applicant's alluded definition of "network" not the actual definition of network, and the specification specifically indicates that the type of network is immaterial to the invention, applicant can not rely upon arguments of supposed complexity to cause the claims to read over the cited prior art.

- 1.2. That: "In a bus-oriented system, only one message may be transmitted at one time. In a communications network, hundreds or thousands of messages may be in transit at the same time. The claimed method is therefore much more complex than a bus-oriented system such as that of Parrish."

This is not found persuasive because as detailed above, applicant is relying on arguments alluding to details of the term "network" which are neither present within the definition or "network" nor found within applicant's specification as a deliberate definition of "network". Therefore, any argued "complexity" can not help to read the claim language over the cited prior art.

- 1.3. That: "the Examiner may not have considered fully certain limitations of the claims. Independent claims 21, 28, 29, and 34 are each limited in that "the local data memories of the at least first and second processor elements [are] not on a common bus". Independent claim 33 is limited in that "the communications managers of the at least first and second processor elements [are] communicatively coupled by means of a message-passing communications network and not solely by a common bus".

This is not found persuasive because both of applicants two points were indeed found in the Parrish et al. references and were fully considered. In the case of the first point, namely "the local data memories ... not on a common bus" if applicant were to have looked at figure 2

of Parrish et al., he would have recognized that all the node memory (DCM, SGM, ILM, IPM) of a single node (NODE A) was all interconnected within that one node (NODE A) via a VME Bus 115 and VSB Bus 116. The same features can be seen in NODE B where the IPM, DCM, and ILM of NODE B was interconnected via separate VME Bus 135 and VSB Bus 136. Therefore, the memories of the first (NODE A) and second processor (NODE B) elements are "not on a common bus" because they are on separate local busses (115, 116 for NODE A, 135, 136 for NODE B).

In the case of the second point, namely "the communications managers ... coupled by a ... network and not solely by a common bus", applicant's attention is drawn to the final cited dictionary definition, that of the term "solely". As seen from that definition, "solely" means "alone; singly; entirely; or exclusively". Therefore, the claim language construct "not solely by a common bus" means "not exclusively by a common bus". As was clearly detailed in the final office action, Parrish et al. indicated that his particular bus was unique in that it was both a message passing network as well as a common bus. Therefore, because Parrish et al.'s disclosed bus was both a network and common bus, it was "not exclusively by a common bus", i.e., not limited to only functioning as a common bus, and therefore was "not solely by a common bus" as claimed.

2. A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) days from the mail date of this letter. Failure to respond within the period for response will result in **ABANDONMENT** of the application (see 35 USC 133, MPEP 710.02, 710.02(b)).

3. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Richard Ellis whose telephone number is (703) 305-9690. The Examiner can normally be reached on Monday through Thursday from 7am to 5pm.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Eddie Chan, can be reached on (703) 305-9712. The fax phone number for the USPTO is: (703)872-9306.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3900.

Richard Ellis
September 13, 2004

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HOUGHTON MIFFLIN

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NOUN:

1. An openwork fabric or structure in which cords, threads, or wires cross at regular intervals.
2. Something resembling an openwork fabric or structure in form or concept, especially:
 - a. A system of lines or channels that cross or interconnect: *a network of railroads.*
 - b. A complex, interconnected group or system: *an espionage network.*
 - c. An extended group of people with similar interests or concerns who interact and remain in informal contact for mutual assistance or support.
3.
 - a. A chain of radio or television broadcasting stations linked by wire or microwave relay.
 - b. A company that produces the programs for these stations.
4.
 - a. A group or system of electric components and connecting circuitry designed to function in a specific manner.
 - b. Computer Science A system of computers interconnected by telephone wires or other means in order to share information. Also called *net* ¹.

VERB:

net-worked , *net-work-ing* , *net-works*

VERB:

tr.

1. To cover with or as if with an openwork fabric or structure.
2. To broadcast over a radio or television network.

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[contrite](#)

Definition: (adjective)
sorry for past misdeeds.
[Petersons.com](#)

[Word of the Day](#)

3. Computer Science To connect (computers) into a network.

VERB:
intr.

To interact or engage in informal communication with others for mutual assistance or support.

OTHER FORMS:

net'work'er (Noun)

See Thesaurus

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software to your desktop computer

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Enter a word or phrase to look up (e.g., abacus):

Search

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HOUGHTON MIFFLIN

< [Soledad](#)[solemn](#) >**sole·ly**  (Sōl'ē, Sō'lē) **KEY****ADVERB:**

1. Alone; singly: *solely responsible.*
2. Entirely; exclusively: *did it solely for love.*

Word of the Day[contrite](#)Definition: (adjective)
sorry for past misdeeds.
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SECOND EDITION

automatic sequencing:

the ability of equipment to put information in order or in a connected series without human intervention.

impulse noise: short bursts of high-level noise such as that resulting from the coupling of transients into a channel. Typical sources of such noises are lightning and transients from switching systems. Impulse noise, which sounds like a click, is not particularly detrimental to voice communications, but it can be detrimental to data communications. Some of the older switching systems, such as the Panel type, create so much impulse noise that DATAPHONE service is not handled by central offices of this type.

miscellaneous common

carrier (MCC): a communications common carrier which is not engaged in the business of providing either a public landline message telephone service or public message telegraph service. Miscellaneous common carriers were initially authorized to serve TV and radio markets. Today they are still viewed as serving these markets, although Domestic Satellite Carriers and Specialized Common Carriers also meet the FCC definition of Miscellaneous Common Carriers.

portability: the ability to use data sets or files with differing operating systems. Volumes whose data sets or files are cataloged in a user catalog can be demounted from storage devices of one system, moved to another system and mounted on storage devices of that system.

remote call forwarding

(RCF): a service offering which allows customers to have a telephone number in an ESS office without having any other local telephone service in that office. Calls coming to the remote call forwarding number are automatically forwarded to any answering location the customer wants.

zero suppression: the elimination from a numeral of zeros that have no significance in the numeral. Zeros that have no significance include those to the left of the nonzero digits in the integral part of a numeral and those to the right of the nonzero digits in the fractional part. Or on a calculator, the process by which unwanted zeros are omitted from the printed or displayed result of a calculation.

JERRY M. ROSENBERG

Attachment to Paper # 20040913

DICTIONARY OF COMPUTERS, INFORMATION PROCESSING, AND TELECOMMUNICATIONS

2ND EDITION

Jerry M. Rosenberg, Ph.D.

**Professor, Graduate School of Management
Chairman, Department of Business Administration
Faculty of Arts and Sciences, Newark
Rutgers University**

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Information Center

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10 9 8 7 6 5 4 3 2

computer instruction code: a code used to represent the instructions in an instruction set. (B) synonymous with *machine code*, *instruction code*. synonym for *operation code*. (A)

computer instruction set: a complete set of the operators of the instructions of a computer together with a description of types of meanings that can be attributed to their operands. synonymous with *machines instruction set*. (A)

computer interface unit (CIU): a device which interfaces with the central processing unit and peripheral devices such as disks or printers.

computerization: a computer's application to any activity formerly done either by hand or without computers.

computerize

(1) equipping an office or plant with computers to facilitate or automate procedures.

(2) converting a manual function into one that is performed by a computer.

computerized bulletin board service (CBBS): see *electronic bulletin board*.

computerized foreman: computers used to minimize inventory and production bottlenecks on the factory floor. If orders or materials change, or if machines break down, these systems will automatically change the schedule.

computerized hyphenation: in word processing, a feature that allows units to use standard rules of grammar to automatically hyphenate most words at the end of a typing line.

computer language: a computer-oriented language whose instructions consist only of computer instructions. synonymous with *machine language*. deprecated term for *computer-oriented language* (A) (B)

computer language symbols: pre-

scribed graphical special meanings or functions in any computer program.

computer learning

(1) the process by which a computer modified programs according to its own memory or experience, that is, changes of logic paths, or parameters values. An example is a chess-playing computer.

(2) in process control, an analog computer is able to change its parameters by a continuous process according to temperatures, or other gauge reports it receives.

computer letter: a letter of standard form into which personal information, that is, names and addresses, are inserted using word processing software.

computer-limited: on buffered computers, a section of a routine in which the time required for computation exceeds the time required to read and write to or from input-output devices.

computer literacy: knowledge of and fluency in computer usage and terminology.

computer-managed instruction: see *CMI*.

computer micrographics: methods and techniques for converting data to or from microform with the assistance of a computer. (E)

computer network: a complex consisting of two or more interconnected computing units. (A) synonym for *user-application network*. (E)

computer numerical control: a state in which a number of numerical control devices are linked together via a data transmission network and brought under the control of a single numerical control machine. see also *direct numerical control*.

computer operation: one of the elementary operations which a computer is designed to perform. synony-

command list.
 IAN, a DO loop
 ly contained by
 DO loop.

I structure con-
 r control struc-

ested within an-
 loop executes
 is encountered;
 es the specified
 I when finished,
 ompletes its first
 cess continues
 as executed the
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power of a
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a subroutine
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ck of data includ-
 routine or block of

ip between the
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 r perform state-
 cluded in or ex-
 first, or outer,

embler program-
 which a term or
 ears in an ex-
 vel at which a
 taining an inner
 processed by an

net loss: the sum of gains and losses between two terminals of a unit or system.

Net 1000: the cornerstone of American Bell's new generation of services. Available throughout the country, it adds function and capability to existing terminals, and provides the user with the ability to design and control an integrated system. see also *AIS*.

net structure: in a data base, a structure of data aggregates or record types arranged in many-to-many relationships. (E)

network (NET)

(1) an interconnected group of nodes. (E)

(2) the assembly of equipment through which connections are made between data stations.

(3) in data processing, a user-application network.

(4) the facilities network is the aggregate of transmission systems, switching systems, and station equipments; it supports a large number of traffic networks. (F)

(5) an electrical/electronic circuit, usually packaged as a single piece of apparatus or on a printed circuit pack. Examples are a transformer network and an equalization network. (F)

(6) see *computer network, data network, fully connected network, heterogeneous network, homogeneous network, loop network, mesh network, multipoint network, public network, star network, synchronous data network, tree network, user-application network*.

network access control: tasks related to network administration controls, including monitoring of system operation, ensuring of data integrity, user identification, recording system access and changes, and approaches

for granting user access.

network access machine (NAM): a computer programmed to aid a user to interact with a computer network, for example, a network connecting a series of host computers.

network access pricing (NAP): a tariffing concept whereby the rate for a service would be strongly influenced by the cost of network elements (e.g., stations, loops, etc.) used to provide that service. Contrasts with the tariffing concept based on the value of service. (F)

network analog: the expression and solution of mathematical relationships between variables using a circuit or circuits to represent these variables. (A)

network analysis: determining the transfer characteristic and other properties of a passive circuit from its configuration, elements, voltages, and the like.

network analyzer: a device that simulates a network such as an electrical supply network. (A)

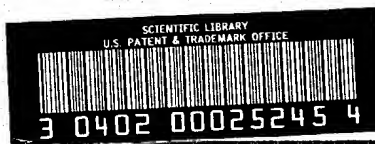
network application: the use to which a network is put, such as data collection or inquiry/update.

network architecture: a set of design principles, including the organization of functions and the description of data formats and procedures, used as the basis for design and implementation of a user-application network. see also *open systems architecture*. (E)

network awareness: that condition where a central processor is cognizant of the status of the network.

network buffer: a storage unit for compensating for a difference in the rate of flow of data received and transmitted in a computer communications systems.

network calculator: a combination of electrical elements for simulating the



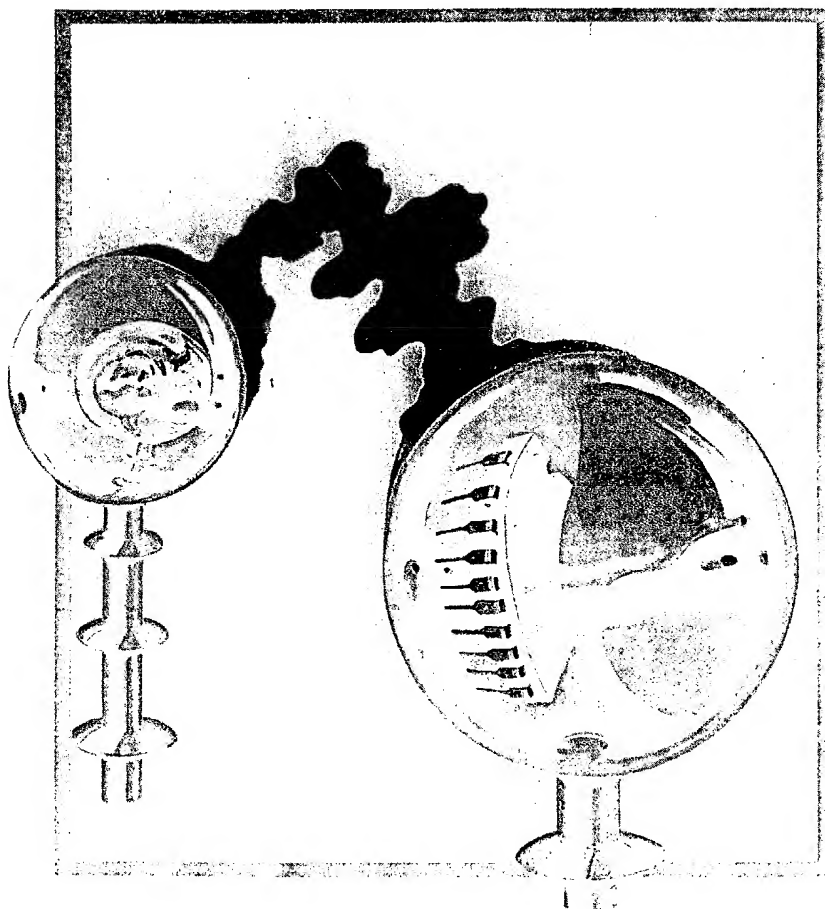
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whose name is familiar to engineers, and hobbyists. His many years of experience in electricity, electronics and his reputation for making complex subjects understandable and enjoyable. Mr. Graf has received his MBA at New York University, is a member of the IEEE, a licensed radio engineer and a first-class radiotelegraph operator in the electronics industry.



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Those who work effectively communicate. Originators of definitions frequently actual use by others.

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While this work is in the field of electronics evolve and establishings. The publisher periodically, thus, is welcomed.

number of bits or hartleys required to transmit the message with specified accuracy over a noiseless medium.

netlist—List of names, symbols, and their connection points which are logically connected in a net.

net loss—The algebraic sum of the gains and losses between two terminals of a circuit. It is equal to the difference in the levels at these points.

net reactance—The difference between the capacitive and inductive reactance in an ac circuit.

network—1. A combination of electrical elements. 2. An interconnected system of transmission lines that provides multiple connections between loads and sources of generation. 3. An organization of stations with a capability for intercommunication, although not necessarily on the same channel. 4. Two or more interrelated circuits. 5. Decentralized computer power that retains the access-to-information characteristic of a centralized computer. The key feature of a network is that communication between the computers in the network is really communication between the programs running on those computers. 6. A complex of two or more interconnected computers. The hardware that supports it generally includes multiplexers, line adapters, modems, and computers with associated peripherals. Software products used consist of modules in the host computer's operating systems, front-end processors, and remote processors that handle services provided to users. 7. A structured connection of computer systems and/or peripheral devices, each remote from the others, exchanging data as necessary to perform the specific function of the connection. 8. The interconnection of a number of points by data communications facilities.

network analog—The expression and solution of a mathematical relationship between variables through the use of a circuit or circuits to represent those variables.

network analysis—1. The obtaining of the electrical properties of a network (e.g., its input and transfer impedances, responses, etc.) from its configuration, parameters, and driving forces. 2. The process of creating a data model of transfer and/or impedance characteristics of a linear network through sine-wave testing over the frequency range of interest.

network analyzer—1. A group of electric-current elements which can readily be connected to form models of electric networks. From corresponding measurements on the model, it is then possible to infer the electrical quantities at various points on the prototype system. 2. Also called network calculator. An analog

device designed primarily for simulating electrical networks. 3. An instrument that evaluates the impedance characteristics of linear networks over a range of frequencies.

network architecture—A descriptive phrase for the combination of hardware and software that comprises a computer network.

network calculator—An analog device designed primarily for simulating electric networks.

network constant—Any one of the resistance, inductance, mutual-inductance, or capacitance values in a circuit or network. When these values are constant, the network is said to be linear.

network filter—1. A transducer for separating waves on the basis of their frequency. 2. A combination of electrical elements, e.g., interconnected resistors, coils and capacitors, that presents relatively small attenuation to signals of certain frequency and great attenuation to all other frequencies.

network master relay—A relay that closes and trips an alternating-current, low-voltage network protector.

network phasing relay—A relay which functions in conjunction with a master relay to limit closure of the network protector to a predetermined relationship between the voltage and the network voltage.

network relay—A form of relay (e.g., voltage, power, etc.) used in the protection and control of alternating-current, low-voltage networks.

network synthesis—1. The obtaining of a network from prescribed electrical properties such as input and transfer impedances, specified responses for a given driving force, etc. 2. The process of deriving the configuration and component values of a network with given performance specifications.

network transfer function—A frequency-dependent function, the value of which is the ratio of the output to the input voltage.

network transformer—A transformer suitable for use in a vault to feed a variable-capacity system of interconnected secondaries.

Neuman's law—Mutual inductance is constant for a given relative physical position of coils, and independent of the fact that the current flows in one or the other coil, and of frequency, current, and phase.

neuristor—1. A two-terminal active device with some of the properties of neurons (e.g., propagation that suffers attenuation and has a uniform velocity and a refractory period). 2. A device that is essentially an active transmission line designed to propagate signals with

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CGM. A software standard related to the widely recognized GKS (Graphical Kernel System) that provides applications programmers with a standard means of describing a graphic as a set of instructions for re-creating it. A graphics metafile can be stored on disk or sent to an output device; CGM provides a common language for describing such files in relation to the GKS standard. *See also* Graphical Kernel System.

computer-independent language A computer language designed to be independent of any given hardware platform. Most high-level languages are intended to be computer-independent; actual implementations of the languages (in the form of compilers and interpreters) tend to have some hardware-specific features and aspects. *See also* computer language.

computer-input microfilm *See* CIM.

computer instruction An instruction that a computer can recognize and act upon (*see* machine instruction); also, the use of a computer in teaching (*see* CAI).

computer-integrated manufacturing *See* CIM.

computer interface unit *See* interface.

computerized axial tomography *See* CAT.

computerized mail *See* electronic mail.

computer language An artificial language that specifies instructions to be executed on a computer. The term covers a wide spectrum, from binary-coded machine language to high-level languages. *See also* assembly language, high-level language, machine code.

computer letter *See* form letter.

computer literacy Knowledge and an understanding of computers combined with the ability to use them effectively. Computers are sometimes thought—unjustifiably—to demand deep technical knowledge or proficiency in mathematics and electronics. In actuality, computers, like any other discipline, inspire different levels of expertise. On the least specialized level, computer literacy involves knowing how to turn on a computer, start and stop simple application programs, and save and print information. At higher levels, computer literacy becomes more detailed, involving the ability of the “power users” to ma-

nipulate complex applications and, possibly, to program in languages such as BASIC or C. At the highest levels, computer literacy leads to specialized—and technical—knowledge of such topics as electronics and assembly language.

computer-managed instruction *See* CMI.

computer name In computer networking, a name that uniquely identifies a computer to the network. A computer's name cannot be the same as any other computer or domain name on the network. A computer name differs from a user name in that the computer name is used to identify a particular computer and all its shared resources (files, peripherals, and so on) to the rest of the system so that they can be accessed; a user name—also called an alias or user ID—is given by the user when he or she attempts to gain access to the computer and/or the network. *Compare* alias, user name.

computer network *See* network.

computer-output microfilm *See* COM.

computer power The ability of a computer to perform work. If defined as the number of instructions the machine can carry out in a given time, computer power is measured in millions of instructions per second (MIPS) or millions of floating-point operations per second (MFLOPS). Power is measured in other ways too, depending on the needs or objectives of the person evaluating the machine. By users or purchasers of computers, power is often considered in terms of the machine's amount of random access memory, the speed at which the processor works, or the number of bits (8, 16, 32, and so on) handled by the computer at one time. Other factors enter into such an evaluation, however; two of the most important are how well the components of the computer work together and how well they are matched to the tasks required of them. Because a computer is, effectively, the sum of its parts, it is in some ways only as “powerful” as the slowest or least effective of its components—including the user. For example, no matter how fast or powerful the computer, its speed will be hampered during operations involving the hard disk if the hard disk is slow (for example, with an



declared within a procedure), or nested records (a record containing a field that is itself a record).

NetBIOS An application program interface (API) that can be used by application programs on a local area network consisting of IBM and compatible microcomputers running MS-DOS, OS/2, or some version of UNIX. Primarily of interest to programmers, NetBIOS provides application programs with a uniform set of commands for requesting the lower-level network services required to conduct sessions between nodes on a network and to transmit information back and forth. *See also* application program interface.

network A group of computers and associated devices that are connected by communications facilities. A network can involve permanent connections, such as cables, or temporary connections made through telephone or other communications links. A network can be as small as a local area network consisting of a few computers, printers, and other devices, or it can consist of many small and large computers distributed over a vast geographic area. Small or large, a computer network exists to provide computer users with the means of communicating and transferring information electronically. Some types of communication are simple user-to-user messages; others, of the type known as distributed processes, can involve several computers and the sharing of workloads or cooperative efforts in performing a task.

network adapter An expansion card or other device used to connect a computer to a local area network.

network administrator The person in charge of operations on either a wide area network or a local area network. The duties of a network administrator (also called a system administrator) can be broad and might include such tasks as installing new workstations and other devices, adding and removing authorized users, archiving files, overseeing password protection and other security measures, monitoring usage of shared resources, and handling malfunctioning equipment.

network architecture The underlying structure of a computer network, including hardware, functional layers, interfaces, and protocols (rules)

used to establish communication and ensure reliable transfer of information. Because a computer network is a mixture of hardware and software, network architectures are designed to provide both philosophical and physical standards for enabling computers and other devices to handle the complexities of establishing communications links and transferring information without conflict. Various network architectures exist, among them the internationally accepted seven-layer ISO Open Systems Interconnection (OSI) model and IBM's Systems Network Architecture (SNA). Both the OSI and SNA architectures organize network functions in layers, each layer dedicated to a particular aspect of communication or transmission and each requiring protocols that define how functions are carried out. The ultimate objective of these and other network architectures is the creation of communications standards that will enable computers of many kinds to exchange information freely and (to the user) transparently. *See also* ISO/OSI model, SNA.

network control program In a communications network that includes a mainframe computer, a program that usually resides in a communications controller and takes over communications tasks such as routing, error control, line control, and polling (checking terminals for transmissions), leaving the main computer free for other functions.

network database In information management, a type of database in which data records can be linked (related to one another) in more than one way. A network database is similar to a hierarchical database in the sense that it contains a progression from one record to another. It differs in being less rigidly structured: Any single record can point to more than one other record and, conversely, can be pointed to by one or more records. In effect, a network database allows more than one path between any two records, whereas a hierarchical database allows only one, from parent (higher-level record) to child (lower-level record). *Compare* hierarchical database, relational database.

network device driver Software that coordi-